



Katadyn – MICROPUR[®] MP 1 Emergency Drinking Water Tablets

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Device Information

The Katadyn Micropur MP 1 Emergency Drinking Water Tablets produce chlorine dioxide disinfectant upon addition to water. The tablets come in a package of 30, individually wrapped in foil pouches in 3 sheets of 10 foil pouches. The manufacturer's user directions involve removing one tablet from its foil pouch and quickly adding to 1 liter (1 quart) of untreated water. Allow a 4-hour contact time away from sunlight to generate a 4 mg/L chlorine dioxide solution. The active ingredients are sodium chlorite and sodium dichloroisocyanurate dihydrate. The tablets generate chlorine dioxide by reacting the sodium chlorite with an acid, sodium bisulfite, and chlorine, sodium dichloroisocyanurate dihydrate, to form chlorine dioxide. The device should be stored in a cool, dry area away from sunlight and heat.

Effectiveness Against Microbial Pathogens

Independent testing using the U.S. Environmental Protection Agency (USEPA) Guide Standard and Protocol for Testing Microbiological Water Purifiers (reference 1) confirms this product met the minimum 6-, 4-, and 3-log inactivations for bacteria, viruses, and protozoan cysts (both *Giardia* and *Cryptosporidium*) when used according to directions (reference 2). Using the Micropur tablets according to the manufacturer's directions results in a disinfectant concentration times contact time (CT) of 960 mg-min/L. This CT is more than adequate for bacteria, viruses, and *Giardia* cysts. However, there is concern for this product being able to routinely provide a 3-log *Cryptosporidium* oocysts inactivation in colder waters (e.g., < 10° C) when used according to directions. For a 3-log *Cryptosporidium* oocyst inactivation, the USEPA proposed CTs higher than that provided by this product when treating colder waters (reference 3). For 5° C water, the USEPA recommends a CT of 1286 mg-min/L. These higher CT values are based on other chlorine dioxide disinfection experiments and take into account the variability and uncertainty of the data (reference 3). To be sure the Micropur tablets provide a 3-log *Cryptosporidium* oocyst inactivation when treating cold water (< 10° C), we recommend increasing the contact time beyond the 4-hour contact time listed in the directions. Based on independent data testing the device under severe conditions required by the USEPA protocol, the Micropur MP1 tablets are given three √s for effectiveness against bacteria, viruses, *Giardia* cysts, and *Cryptosporidium* oocysts (for an explanation of the rating checks [click here](#)). The following table summarizes Katadyn's Micropur MP1 emergency drinking water tablets expected performance, evaluation rating, and the mechanism by which pathogens are inactivated.

[®] MICROPUR is a registered trademark of Katadyn Products Inc., Birkenweg 4, Switzerland. Use of a trademarked product does not imply endorsement by the U.S. Army, but is intended only in identification of a specific product.

Table. Expected Performance Against Microbial Pathogens When Used as Directed.

Microbial Pathogen Type	Expected Disinfection Capability	Evaluation Rating	Inactivation/removal Mechanism
Bacteria	> 6-log	√√√	disinfection
Viruses	> 4-log	√√√	disinfection
<i>Giardia</i> cysts	> 3-log	√√√	disinfection
<i>Cryptosporidium</i> oocysts	> 3-log*	√√√*	disinfection

* Recommend additional contact time for waters < 10° C.

Production Capacity

One package of Katadyn's Micropur MP 1 Emergency Drinking Water Tablets treats 30 liters (one tablet per liter of water).

Cleaning, Replacement, End of Life Indicator, Shelf Life.

The device has an expiration date. However, the date of production is not indicated, therefore shelf life cannot be determined. Based on the device's expiration date and the date of purchase, it can be assumed that the minimum shelf life is 3 years.

Weight and Size

The total weight of the entire package (30 tablets) is approximately 20 grams. The tablets come in 3 sheets of 10 tablets. Each sheet measures approximately 17 cm long x 6.5 cm wide. Three sheets are approximately 1 cm deep.

Cost

The tablets cost about \$20.00 per package.

Device Evaluation

Independent testing using the USEPA Guide Standard and Protocol for Testing Microbiological Water Purifiers (reference 1) confirms the Micropur MP 1 tablets met the minimum 6-, 4-, and



3-log inactivations for bacteria, viruses, and protozoan cysts (both *Giardia* and *Cryptosporidium*) (reference 2). Due to variability and uncertainty in other *Cryptosporidium* oocyst inactivation studies with chlorine dioxide, we recommend additional contact time beyond the manufacturer directed 4-hour contact time to be sure of achieving a 3-log *Cryptosporidium* oocyst inactivation when treating colder waters ($< 10^{\circ}\text{C}$). Turbidity will reduce chlorine dioxide concentrations and subsequently its disinfection capability, although to a lesser extent than water temperature (reference 4). Under most water quality conditions expected to be encountered, turbidity should not adversely affect the disinfection capability of the tablets. However, in very cloudy or turbid water, additional contact time beyond the 4-hour manufacturer contact time is recommended. Both water temperature and turbidity (cloudiness) can't often be measured accurately in the field and will require user subjectivity. In these situations, a conservative approach is recommended and additional contact time should be provided to protect the Soldier's health. These tablets generate chlorine dioxide and will produce chlorite, a byproduct of chlorine dioxide, when treating water containing organic matter (reference 4). Chlorine dioxide and chlorite can have serious adverse health effects for children, infants, and fetuses as a result of short-term exposure. But, no adverse health effects are expected for healthy adult individuals using this product for short periods of time and at manufacturer recommended dosages.

Advantages

- Independent testing using the USEPA Protocol confirms the device consistently provides 6-log bacteria, 4-log virus, and 3-log *Giardia* and *Cryptosporidium* inactivation under most water quality conditions expected.
- Very small and lightweight.
- Simple and inexpensive to use.
- No adverse health effects expected in healthy adults from short-term use.

Disadvantages

- Minimum 4-hour wait time required for adequate treatment. Recommend longer wait time for treating colder waters ($< 10^{\circ}\text{C}$) to ensure adequate *Cryptosporidium* inactivation.
- Does not reduce or remove particulate matter.
- Requires user subjectivity with respect to water temperature and cloudiness.
- May cause adverse health effects in children, infants, and fetuses from short-term use.



COTS Purifiers – Army Study Program, Project No. 31-MA-03E0-05.

References

1. USEPA, Registration Division Office of Pesticide Program, Criteria and Standards Division Office of Drinking Water, 1987. *Guide Standard and Protocol for Testing Microbiological Water Purifiers*. Washington, D.C.
2. Independent testing data provided by Katadyn, 2001.
3. Federal Register, 2003. *National Primary Drinking Water Regulations: Long Term 2 Enhanced Surface Water Treatment Rule; Proposed Rule*, 68(154), 47640-47795.
4. U.S. Army Center for Health Promotion and Preventive Medicine, 2005. *Technical Information Paper; Chlorine Dioxide Disinfection in the Use of Individual Water Purification Devices*, Aberdeen Proving Ground, MD.

